

Brain Organoids and the Study of Neurodevelopment.

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Public Summary:

We discussed how human brain organoids made from stem cells could add value to the understanding of neurological disorders. Plus, we described how this technology was used for drug discovery. We finished with a critical view on the future perspective of this method and potential ethical implications.

Scientific Abstract:

Brain organoids are 3D self-assembled structures composed of hundreds of thousands to millions of cells that resemble the cellular organization and transcriptional and epigenetic signature of a developing human brain. Advancements using brain organoids have been made to elucidate the genetic basis of certain neurodevelopmental disorders, such as microcephaly and autism; and to investigate the impact of environmental factors to the brain, such as during Zika virus infection. It remains to be explored how far brain organoids can functionally mature and process external information. An improved brain organoid model might reproduce important aspects of the human brain in a more reproducible and high-throughput fashion. This novel and complementary approach in the neuroscience toolbox opens perspectives to understand the fundamental features of the human neurodevelopment, with implications to personalize therapeutic opportunities for neurological disorders.

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